

## **UNIVERSAL COMPRESSOR ASSEMBLY**

The present invention is related to U.S. Patent Application No. 10/722,659, filed 24 November 2003, pending.

### **BACKGROUND OF THE INVENTION**

#### 5    1. Field of the Invention

The present invention relates to a universal compressor assembly, and more particularly to a universal compressor assembly for assembling onto various vehicles or the like.

#### 2. Description of the Prior Art

10        Typical compressors comprise three or more pistons slidably received in one or more cylinders, in order to form a reciprocating piston type compressor of axial design.

The typical compressors are normally disposed in the engine compartment of vehicles, and coupled to the refrigerant systems for  
15    pumping coolant or other agents through the refrigerant piping systems.

Normally, various kinds of typical compressors are designed for attaching or coupling to the engines of different vehicles. For example, the compressors designed for such as GM® or FORD®  
20    vehicles may only be used in GM® or FORD® vehicles only, and may not be attached to the other vehicles.

Similarly, the compressors designed for VOLKSWAGEN® or NISSAN® or TOYOTA® vehicles, for example, may only be used in VOLKSWAGEN® or NISSAN® or TOYOTA® vehicles only,  
25    and may not be attached to the other vehicles; i.e., the compressors are all designed for being secured or attached onto one particularly designed refrigerant system of one particular or selected vehicle

only, and no parts or elements of the compressors may be used commonly.

For vehicle repairing shops or companies, they have to order and store various kinds of compressors in stock for different  
5 vehicles. In addition, the vehicle repairing shops or companies have to prepare or rent a large space or building to store many compressors for different vehicles.

For some of the vehicle repairing companies who have no spare spaces or buildings to store the compressors, the vehicle  
10 repairing companies thus have to order the required compressors from particular companies when required. Some times, it may take a long time to wait for a compressor.

The present invention has arisen to mitigate and/or obviate the afore-described disadvantages of the conventional universal  
15 compressor assemblies.

### **SUMMARY OF THE INVENTION**

The primary objective of the present invention is to provide a universal compressor assembly including one or more caps or covers for selectively attaching to a universal compressor body, and  
20 for allowing the universal compressor assembly to be easily and selectively attached to different vehicles.

The other objective of the present invention is to provide a universal compressor assembly including fewer parts or elements required to be stored, for reducing the required storing spaces or  
25 buildings for the compressors for different vehicles.

In accordance with one aspect of the invention, there is provided a universal compressor assembly comprising a shell

including two ends and a cylinder provided therein, a shaft rotatably and slidably received in the cylinder and including a cam member disposed thereon, at least three pistons slidably received in the cylinder and engageable with the cam member, to alternatively  
5 actuate the shaft to move axially relative to the cylinder, two valve plates disposed on ends of the cylinder to control fluid flowing passage, a first cover and a first cap selectively secured to the ends of the shell, to enclose and retain the cylinder and the shaft and the pistons and the valve plates within the shell, and for attaching to  
10 one vehicle. One or more second covers and one or more second cap may further be provided to be selectively secured to the ends of the shell, to enclose and retain the cylinder and the shaft and the pistons and the valve plates within the shell, and for attaching to the other vehicles when the first cover and the first cap are disengaged from  
15 the ends of the shell.

The shell and the cylinder and the shaft and the pistons and the valve plates may thus be commonly used for all of the compressors. Only the covers and caps are required to be changed or replaced with the other ones, for attaching onto different vehicles.

20 Further objectives and advantages of the present invention will become apparent from a careful reading of the detailed description provided hereinbelow, with appropriate reference to the accompanying drawings.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

25 FIG. 1 is a partial exploded view of a universal compressor assembly in accordance with the present invention;

FIG. 2 is another partial exploded view of the universal

compressor assembly;

FIGS. 3, 4, 5 are perspective views illustrating three different arrangements of the universal compressor assembly; and

FIGS. 6, 7, 8 are partial exploded views of the universal compressor assemblies as shown in FIGS. 3-5 respectively.

### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring to the drawings, and initially to FIGS. 1 and 2, a universal compressor assembly in accordance with the present invention comprises a shell 10 including a cylinder 11 formed or provided therein and formed integral with each other, a shaft 12 rotatably and slidably received in the cylinder 11 of the shell 10 and including a cam member 13 disposed thereon, and three or more pistons 14 slidably received in the cylinder 11 of the shell 10 and engageable with the cam member 13, to alternatively actuate or force the shaft 12 to move axially along or relative to the cylinder 11 of the shell 10.

The universal compressor assembly further comprises a first cover 20 and a first cap 30 selectively secured to the ends of cylinder 11 of the shell 10 (FIGS. 3, 6), to enclose the cylinder 11 and to retain the shaft 12 and the pistons 14 within the cylinder 11 of the shell 10. The universal compressor assembly further comprises two valve plates 15, 16 disposed on the ends of the cylinder 11, and to be received in the first cover 20 and the first cap 30 respectively for controlling the flowing passage or directions of the fluid or coolant agent to be pumped by the universal compressor assembly. The first cover 20 and the first cap 30 are designed or shaped for attaching or securing to one refrigerant system of one of

the vehicles, for example.

The universal compressor assembly further comprises one or more second covers 21, 22 and one or more second caps 31, 32 selectively secured to the ends of the shell 10 (FIGS. 4, 7; and 5, 8),  
5 for attaching or securing to the refrigerant systems of the other vehicles. A clutch device 40 is normally provided and attached to the shaft 12 for clutching purposes.

As shown in FIGS. 3-5 and 6-8, the cylinder 11 of the shell 10 and the shaft 12 and the pistons 14 and the valve plates 15, 16 may  
10 thus be commonly used and selectively assembled between the first cover 20 and the first cap 30, or the second covers 21, 22 and the second caps 31, 32, for allowing the universal compressor assembly to be attached or secured to the refrigerant systems of various or different vehicles.

15 The users, particularly the vehicle repairing companies or shops, may only be required to prepare and store one set of the cylinder 11 of the shell 10 and the shaft 12 and the pistons 14 and the valve plates 15, 16, and one or more pairs of the covers 20-22 and the caps 30-32, for attaching or securing to the refrigerant  
20 systems of different vehicles.

It is to be noted that all of the universal compressors may use the same or the identical cylinder 11 and shaft 12 and pistons 14 and valve plates 15, 16, such that the cylinder 11 and the shaft 12 and the pistons 14 and the valve plates 15, 16 may be manufactured with  
25 mass production, and may be manufactured with the most efficient but the cheapest ones.

The universal compressors benefit the vehicle repairing

companies much, because they are not required to order and store various kinds of compressors in stock for different vehicles, and they may prepare or order fewer compressor parts or elements for different vehicles, and they need not to rent a large space or  
5 building to store the compressors parts or elements.

Accordingly, the universal compressor assembly in accordance with the present invention includes one or more caps or covers for selectively attaching to a universal compressor body, and for allowing the universal compressor assembly to be easily and  
10 selectively attached to different vehicles, and includes fewer parts or elements required to be stored, for reducing the required storing spaces or buildings for the compressors for different vehicles.

Although this invention has been described with a certain degree of particularity, it is to be understood that the present  
15 disclosure has been made by way of example only and that numerous changes in the detailed construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as hereinafter claimed.